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Opinion piece

Opportunities and challenges in physical activity research in young people

Afroditi Stathi *, Fiona B. Gillison, Chris J. Riddoch

School for Health, University of Bath, United Kingdom

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Abstract

The purpose of this opinion piece is to discuss opportunities and challenges to physical activity [PA] research in young people. Two key limitations were identified; (i) the lack of specificity of the types of PA measured and standards in reporting this, and (ii) lack of attention given to ecological frameworks. First, it is argued that a greater specificity of measurement is needed as PA undertaken for different purposes and/or at different levels of intensity is predicted by different determinants, and its uptake mediated by different factors. As such, researchers should carefully define the types and dimensions of physical activity they want to target and choose the appropriate physical activity measure accordingly. Second, given the relatively modest success rates of intensive PA interventions based solely on an individual approach, consideration of ecological research frameworks is advocated, as such approaches that consider multiple levels of influence on individual behaviour have the potential to facilitate far greater understanding of the full range of determinants of PA. Ultimately, it is suggested that low levels of PA among young people might be better addressed through the application of solutions at the local level, and that by tailoring PA programmes to the characteristics of the local environment and population rather than viewing contextual differences as a problem, the efficacy of promising means of intervention could be increased.

Keywords: Child; Adolescent; Exercise; Research design

Introduction

Lifelong physical activity reduces the risk for a variety of chronic diseases developed in adulthood.[1] As most of these diseases result from processes that begin early in life, promoting active lifestyles in children presents an attractive strategy for promoting adult health.[2] However, in order to track secular trends of the physical activity (PA) levels of our young people and evaluate the interventions designed to increase them, we need to be able to define and measure PA accurately. Furthermore, we need to establish minimum standards in the collection and reporting of data that will allow us to reliably combine research from different sources in order to arrive at a body of convincing evidence relating to the determinants, mediators and outcomes of PA in children and adolescents. We acknowledge that great improvements have been made in developing more accurate measures of PA. In this article we argue that research into PA in young people is compromised by limitations in two main areas: (i) the lack of specificity of the type of PA measured and how it is reported, (ii) the lack of weight given to ecological research frameworks and naturalistic experiments.

(i) The lack of specificity of type of physical activity measured and standards of reporting

There is no doubt that researchers require robust, reliable and valid instruments for measuring the particular element of PA of interest to them. However we argue that even within the constraints of existing imperfect measures there are a number of steps we could take as a research community to improve the reliability and accuracy of our knowledge. The assessment of the relationship between PA and its determinants, mediators and outcomes will remain inaccurate, even using instruments of pin-point accuracy, if researchers fail to differentiate between the different constituent behaviours encompassed within the global umbrella of the term 'physical

* Corresponding author.
E-mail address: A.Stathi@bath.ac.uk (A. Stathi).

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activity'. Physical activity takes place in different contexts (e.g., home/family, school and community) and encompasses a wide range of daily activities (e.g., household chores, commuting, competitive sports) carried out at a range of different frequencies, durations, and intensities. All too often, studies fail to adequately differentiate between these dimensions and levels in either their measurement or reporting of PA. The PA undertaken for different purposes and/or at different levels of intensity is predicted by different determinants, and its uptake mediated by different factors. For example, low intensity physical activity such as walking may be best predicted by factors such as income and distance from school,[3] whereas participation in vigorous exercise such as sport is better predicted by personal resources such as perceived competence and social support.[4] Therefore by collapsing the different domains of PA into a single construct, reducing multiple and potentially very different relationships in a single metric, may result in inaccurate and even misleading estimates of effect.

The clear specification of PA dimensions is also imperative for the choice of an appropriate measure. Each instrument differs in its reliability and accuracy across different dimensions of PA. For example, pedometers may well be a more accurate measure than self-report for total PA, but may be much poorer at estimating participation in vigorous PA. For some instruments, research has already been conducted to demarcate reliability for different types or intensity of PA (e.g., for the Leisure Time Exercise Questionnaire (LTEQ),[5] and the Three Day Physical Activity Recall (3DPAR)[6]). However this evidence is rare. The selection of the most appropriate measure is crucial in young children who present particular challenges for accurate measurement; both as their movement is characterised by frequent, intermittent and spontaneous bursts of activity of highly variable velocity and movement type, and as they are unable to accurately recall their PA participation.[7]

To consolidate the growing body of evidence that exists relating to PA in children and young people, it is vital that we are able to accurately extract the type, intensity and context of PA from research reports. Only then can we meaningfully compare findings in the certainty that we are comparing like with like, in order to assess the reliability of the relationships between constructs across studies, contexts and populations. To date the majority of reviews assessing the correlates of PA [e.g., Ref. 8] or outcome of interventions [e.g., Ref. 9] have not differentiated between PA dimensions. While this may be as indicative of the lack of availability of information as it is of a lack of considered importance, it may be one reason why few reviews report consistent findings. A positive shift towards the presentation of more detailed information has been noted recently, with a number of studies providing detailed information regarding the type, intensity and context of PA.[10]

(ii) The lack of attention given to ecological frameworks and naturalistic experiments

Randomised controlled trials (RCTs) have traditionally been considered the gold standard in scientific rigour, and the most reliable form of research evidence. However, they tend to focus only on a limited number of constructs that can be clearly defined and manipulated. Given that we do not yet fully understand the principal determinants of PA, it has been argued that current promotion strategies are better described as evidence-informed rather than evidence-based [e.g., Ref. 11]. As such, it is argued that we should take a step back to further investigate the causes of low levels of PA to better inform the design of physical activity interventions.

On this theme Sallis and Cervero[12] has called for the need to incorporate a transdisciplinary paradigm in PA research and practice, which combines concepts and methods from disciplines ranging from exercise and behavioural sciences, to urban planning and transportation. The paradigm extends the ecological model of PA by considering multiple levels of influence on individual behaviour; intrapersonal, interpersonal and/or social, organisational, institutional, community, and policy. For example, natural experiments place value on community participation as a means of translating the key constituents of previously successful interventions into context-specific approaches, i.e., the "real-life" environment is perceived as a source of solutions rather than part of the problem.[13] Lessons learned from natural experiments suggest that low levels of PA among youth may be better addressed through the application of solutions at the local level, rather than persisting with a one-size-fits-all approach.[14] The Trial of Activity for Adolescent Girls [TAAG] provides a good example of how sensitivity to context-specific characteristics led to the implementation of formative research which informed the intervention development taking into consideration the needs of the multiple centres involved in this trial.[15] For example, intervention strategies were chosen to meet the preferences (fun, time to socialise) and barriers (fear of injury) for physical activity as these were identified in an activity checklist and refined in subsequent semi-structured interviews and focus groups. However, perhaps the greatest challenge and potential deterrent for researchers in embarking on such a broad approach is that ecological solutions require extensive resources and close collaboration between researchers, communities and public decision makers. These are groups who are not practiced in working together, and would demand very different skills from researchers than those on which they currently rely.

In summary, we have argued that the measurement of PA and our ability to identify its key determinants and mediators is not solely reliant on the accuracy of the existing instruments, but also on design issues. There is a need for clear identification of the dimensions of PA examined

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in research with children and young people. We identify promise for establishing a greater understanding of the determinants of PA through the application of ecological research frameworks, and research in naturalistic settings. However, this is not to suggest that we should wait until we know everything before beginning to act, as the very process of attempting to translate efficacious trials into effective community programmes provides us with important lessons for the focus of basic research and future RCTs.[16]

Practical implications

- Intervention developers should carefully define the types and dimensions of physical activity they want to target.
- The choice of an appropriate physical activity measure for programme evaluation should be guided by the dimensions of physical activity that the programme aims to change.
- Tailoring physical activity programmes to the characteristics of the local environment and population could increase their effectiveness. Interventions which accommodate these ideas need to be developed and evaluated using appropriate research methods.

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